

Amendments to the Claims

The following Listing of Claims replaces all prior versions, and listings, of claims in the application.

Listing of Claims:

Claim 1 (original): A wavelength tunable light source, comprising:
a resonant light path supporting oscillation of light in at least one longitudinal mode;
an optical gain medium disposed in the resonant light path;

an optical grating have a grating surface arranged to receive incident light along the light path at an incidence angle relative to the grating surface and to diffract light along the light path at a diffraction angle relative to the grating surface different from the incidence angle;

a first acousto-optic deflector arranged to intercept light along the light path, and operable to deflect the intercepted light and to induce a first Doppler shift of longitudinal mode frequencies; and

a second acousto-optic deflector arranged to intercept light along the light path, and operable to deflect the intercepted light and to induce a second Doppler shift of longitudinal mode frequencies, wherein the first and second Doppler shifts are in opposite directions.

Claim 2 (original): The wavelength tunable light source of claim 1, further comprising a second optical grating have a grating surface arranged to receive incident light along the light path at a second incidence angle relative to the grating surface and to diffract light along the light path at a second diffraction angle relative to the grating surface different from the second incidence angle.

Claim 3 (original): The wavelength tunable light source of claim 2, wherein the first grating and the first acousto-optic deflector together produce a first optical frequency filter function and the second grating and the second acousto-optic deflector together produce a second optical frequency filter function substantially identical to the first optical frequency filter function.

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Claim 4 (original): The wavelength tunable light source of claim 2, wherein the first grating and the first acousto-optic deflector are arranged in a first segment of the light path and the second grating and the second acousto-optic deflector are arranged in a second segment of the light path.

Claim 5 (original): The wavelength tunable light source of claim 4, wherein the first light path segment substantially corresponds a mirror image of the second light path reflected through a mirror plane.

Claim 6 (original): The wavelength tunable light source of claim 2, wherein the optically resonant light path is defined between a first mirror and a second mirror.

Claim 7 (original): The wavelength tunable light source of claim 6, wherein the gain medium, the first grating, the first acousto-optic deflector, the second acousto-optic deflector, and the second grating elements are arranged in order along the light path from the first mirror to the second mirror.

Claim 8 (original): The wavelength tunable light source of claim 7, further comprising a first half-wave plate disposed between the first grating and the first acousto-optic deflector, and a second half-wave plate disposed between the second grating and the second acousto-optic deflector.

Claim 9 (original): The wavelength tunable light source of claim 6, wherein the first acousto-optic deflector, the first grating, the gain medium, the second grating, and the second acousto-optic deflector are arranged in order along the light path from the first mirror to the second mirror.

Claim 10 (original): The wavelength tunable light source of claim 9, wherein the first grating and the first acousto-optic deflector are arranged in a first segment of the light path and the second grating and the second acousto-optic deflector are arranged in a second segment of the light path.

Claim 11 (original): The wavelength tunable light source of claim 10, wherein the first light path segment arrangement substantially corresponds to a mirror image of the second light path arrangement reflected through a mirror plane.

Claim 12 (original): The wavelength tunable light source of claim 10, wherein the first light path segment arrangement substantially corresponds to a mirror image of the second light path arrangement reflected through a pair of substantially orthogonal mirror planes.

Claim 13 (original): The wavelength tunable light source of claim 2, wherein the light path is a circulating light path.

Claim 14 (original): The wavelength tunable light source of claim 13, wherein the gain medium, the first grating, the first acousto-optic deflector, the second acousto-optic deflector, and the second grating are arranged in order along the circulating light path.

Claim 15 (original): The wavelength tunable light source of claim 14, further comprising first and second mirrors disposed in the circulating light path between the first and second acousto-optic deflectors.

Claim 16 (original): The wavelength tunable light source of claim 14, further comprising an optical isolator disposed in the circulating light path.

Claim 17 (original): The wavelength tunable light source of claim 1, wherein the optically resonant light path is defined between a first mirror and a second mirror.

Claim 18 (original): The wavelength tunable light source of claim 17, wherein at least one of the first and second mirrors is a retroreflector.

Claim 19 (original): The wavelength tunable light source of claim 18, wherein the first acousto-optic deflector, the gain medium, the grating, and the second acousto-optic deflector are arranged in order along the light path from the first mirror to the second mirror.

Claim 20 (currently amended): The wavelength tunable light source of claim 1, further comprising a driver that is connected to the first and second acousto-optic deflectors and ~~operable to drives~~ the first acousto-optic deflector with a first signal having a first time-varying frequency profile and ~~to drives~~ the second acousto-optic deflector with a second signal having a second time-varying frequency profile substantially corresponding to a time-shifted version of the first time-varying frequency profile.

Claims 21-23 (canceled)

Claim 24 (new): The wavelength tunable light source of claim 1, further comprising a driver that is connected to the first and second acousto-optic deflectors and performs operations comprising:

driving the first acousto-optic device with a first signal having a first time-varying frequency profile; and

driving the second acousto-optic device with a second signal having a second time-varying frequency profile, wherein the second time-varying frequency profile differs from the first time-varying frequency profile by an amount substantially proportional to a time rate of change of the output wavelength profile;

wherein the output light beam is tunable over the specified frequency range without observable hopping between longitudinal modes.

Claim 25 (new): The wavelength tunable light source of claim 24, wherein the first and second time-varying frequency profiles (f_1 and f_2) are given by:

$$f_2 = A + B\lambda + \frac{\alpha}{4} \frac{d\lambda}{dt}$$

and

$$f_1 = A + B\lambda - \frac{\alpha}{4} \frac{d\lambda}{dt}$$

wherein A, B, and α are constants and $d\lambda/dt$ is the time range of change of the output wavelength profile λ .

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Claim 26 (new): The wavelength tunable light source of claim 24, wherein the first and second acousto-optic devices are selected from: acousto-optic deflectors; acousto-optic modulators; and acousto-optic tunable filters.